1

SEQUENCE LISTING

<110> Punnonen, Juha
     Stemmer, Willem P.C.
     Whalen, Robert Gerald
     Howard, Russell
     Maxygen, Inc.

<120> Optimization of Immunomodulatory Properties of Genetic
     Vaccines

<130> 018097-030300US

<140> US 09/248,716
<141> 1999-02-10

<150> US 60/074,294
<151> 1998-02-11

<160> 6

<170> PatentIn Ver. 2.0

<210> 1
<211> 3632
<212> DNA
<213> Homo sapiens

<220>
<223> human interleukin 10 receptor (IL-10R)

<400> 1
aaagagctgg aggcgcgcag gccggctccg ctccggcccc ggacgatgcg gcgcgcccag 60
gatgctgccg tgcctcgtag tgctgctggc ggcgctcctc agcctccgtc ttggctcaga 120
cgctcatggg acagagctgc ccagcccctc gtctgtgtgg tttgaagcag aattttttcca 180
ccacatcctc cactggacac ccatcccaaa tcagtctgaa agtacctgct atgaagtggc 240
gctcctgagg tatggaatag agtcctggaa ctccatctcc aactgtagcc agaccctgtc 300
ctatgacctt accgcagtga ccttggacct gtaccacagc aatggctacc gggccagagt 360
gcgggctgtg gacggcagcc ggcactccaa ctggaccgtc accaacaccc gcttctctgt 420
ggatgaagtg actctgacag ttggcagtgt gaacctagag atccacaatg gcttcatcct 480
cgggaagatt cagctaccca ggcccaagat ggcccccgcg aatgacacat atgaaagcat 540
cttcagtcac ttccgagagt atgagattgc cattcgcaag gtgccgggaa acttcacgtt 600
cacacacaag aaagtaaaac atgaaaactt cagcctccta acctctggag aagtgggaga 660
gttctgtgtc caggtgaaac catctgtcgc ttcccgaagt aacaagggga tgtggtctaa 720
agaggagtgc atctcccctca ccaggcagta tttcaccgtg accaacgtca tcatcttctt 780
tgcctttgtc ctgctgctct ccggagccct cgcctactgc ctggccctcc agctgtatgt 840
gcggcgccga aagaagctac ccagtgtcct gctcttcaag aagcccagcc ccttcatctt 900
catcagccag cgtccctccc cagagaccca agacaccatc caccgcttg atgaggaggc 960
cttttttgaag gtgtccccag agctgaagaa cttggacctg cacggcagca cagacagtgg 1020
ctttggcagc accaagccat ccctgcagac tgaagagccc cagttcctcc tccctgaccc 1080
tcaccccag gctgacagaa cgctgggaaa cggggagccc cctgtgctgg gggacagctg 1140
cagtagtggc agcagcaata gcacagacag cgggatctgc ctgcaggagc ccagcctgag 1200
ccccagcaca gggcccacct gggagcaaca ggtggggagc aacagcaggg gccaggatga 1260
cagtggcatt gacttagttc aaaactctga gggccgggct ggggacacac agggtggctc 1320
ggccttgggc caccacagtc ccccggagcc tgaggtgcct ggggaagaag acccagctgc 1380
tgtggcattc cagggttacc tgaggcagac cagatgtgct gaagagaagg caaccaagac 1440
aggctgcctg gaggaagaat cgcccttgac agatggcctt ggccccaaat tcgggagatg 1500
cctggttgat gaggcaggct tgcatccacc agccctggcc aagggctatt gaaacagga 1560
tcctctagaa atgactctgg cttcctcagg ggccccaacg ggacagtgga accagcccac 1620
tgaggaatgg tcactcctgg ccttgagcag ctgcagtgac ctggaatat ctgactggag 1680
ctttgcccat gaccttgccc ctctaggctg tgtggcagcc ccaggtggtc tcctgggcag 1740

2

```
ctttaactca gacctggtca ccctgcccct catctctagc ctgcagtcaa gtgagtgact 1800
cgggctgaga ggctgctttt gattttagcc atgcctgctc ctctgcctgg accaggagga 1860
gggccctggg gcagaagtta ggcacgaggc agtctgggca cttttctgca agtccactgg 1920
ggctggccca gccaggctgc agggctggtc agggtgtctg gggcaggagg aggccaactc 1980
actgaactag tgcagggtat gtgggtggca ctgacctgtt ctgttgactg gggccctgca 2040
gactctggca gagctgagaa gggcagggac cttctccctc ctaggaactc tttcctgtat 2100
cataaaggat tatttgctca ggggaaccat ggggcttct ggagttgtgg tgaggccacc 2160
aggctgaagt cagctcagac ccagacctcc ctgcttaggc cactcgagca tcagagcttc 2220
cagcaggagg aagggctgta ggaatggaag cttcagggcc ttgctgctgg ggtcattttt 2280
aggggaaaaa ggaggatatg atggtcacat ggggaacctc ccctcatcgg gcctctgggg 2340
caggaagctt gtcactggaa gatcttaagg tatatatttt ctggacactc aaacacatca 2400
taatggattc actgagggga gacaaaggga gccgagaccc tggatggggc ttccagctca 2460
gaacccatcc ctctggtggg tacctctggc acccatctgc aaatatctcc ctctctccaa 2520
caaatggagt agcatccccc tggggcactt gctgaggcca agccactcac atcctcactt 2580
tgctgcccca ccatcttgct gacaacttcc agagaagcca tggttttttg tattggtcat 2640
aactcagccc tttgggcggc ctctgggctt gggcaccagc tcatgccagc cccagagggt 2700
cagggttgga ggcctgtgct tgtgtttgct gctaatgtcc agctacagac ccagaggata 2760
agccactggg cactgggctg gggtcctgc cttgttggtg ttcagctgtg tgattttgga 2820
ctagccactt gtcagagggc ctcaatctcc catctgtgaa ataaggactc cacctttagg 2880
ggaccctcca tgtttgctgg gtattagcca agctggtcct gggagaatgc agatactgtc 2940
cgtggactac caagctggct tgttcttat gccagaggct aacagatcca atgggagtcc 3000
atggtgtcat gccaagacag tatcagacac agcccagaa gggggcatta tgggccctgc 3060
ctccccatag gccatttgga ctctgccttc aaacaaaggc agttcagtcc acaggcatgg 3120
aagctgtgag gggacaggcc tgtgcgtgcc atccagagtc atctcagccc tgcctttctc 3180
tggagcattc tgaaacaga tattctggcc cagggaatcc agccatgacc cccaccccct 3240
tgccaaagta ctcttaggtg ccagtctggt aactgaactc cctctggagg caggcttgag 3300
ggaggattcc tcagggttcc cttgaaagct ttatttattt attttgttca tttatttatt 3360
ggagaggcag cattgcacag tgaaagaatt ctggatatct caggagcccc gaaattctag 3420
ctctgacttt gctgtttcca gtggtatgac cttggagaag tcacttatcc tcttggagcc 3480
tcagtttcct catctgcaga ataatgactg acttgtctaa ttcatagga tgtgaggttc 3540
tgctgaggaa atgggtatga atgtgccttg aacacaaagc tctgtcaata agtgatacat 3600
gtttttatt ccaataaatt gtcaagacca ca                                 3632
```

<210> 2
<211> 3497
<212> DNA
<213> Mus musculus

<220>
<223> mouse interleukin 10 receptor (IL-10R)

<400> 2
```
ccattgtgct ggaaagcagg acgcgccggc cggaggcgta aaggccggct ccagtggacg 60
atgccgctgt gcgcccagga tgttgtcgcg tttgctccca ttcctcgtca cgatctccag 120
cctgagccta gaattcattg catacgggac agaactgcca agcccttcct atgtgtggtt 180
tgaagccaga tttttccagc acatcctcca ctggaaacct atcccaaacc agtctgagag 240
cacctactat gaagtggccc tcaaacagta cggaaactca acctggaatg acatccatat 300
ctgtagaaag gctcaggcat tgtcctgtga tctcacaacg ttcaccctgg atctgtatca 360
ccgaagctat ggctaccggg ccagtgtccg ggcagtggac aacagtcagt actccaactg 420
gaccaccact gagactcgct tcacagtgga tgaagtgatt ctgacagtgg atagcgtgac 480
tctgaaagca atggacggca tcatctatgg acaatccat cccccaggc ccacgataac 540
ccctgcaggg gatgagtacg aacaagtctt caaggatctc cgagtttaca agattttccat 600
ccggaagttc tcagaactaa agaatgcaac caagagagtg aaacaggaaa ccttcacccct 660
cacggtcccc ataggggtga aaagttttg tgtcaaggtg ctgcccgct tggaatcccg 720
aattaacaag gcagatgac cggaggagca gtgtttactt atcacgacgg agcagtattt 780
cactgtgacc aacctgagca tcttagtcat atctatgctg ctattctgtg gaatcctggt 840
ctgtctggtt ctccagtggt acatccggca cccggggaag ttgcctacag tcctggtctt 900
caagaagcct cacgacttct tcccagccaa ccctctctgc cagaaactc ccgatgccat 960
tcacatcgtg gacctggagg ttttcccaaa ggtgtcacta gagctgagag actcagtcct 1020
gcatggcagc accgacagtg gctttggcag tggtaaacca tcacttcaga ctgaagagtc 1080
ccaattcctc ctccctggct cccaccccca gatacagggg actctggaa aagaagagtc 1140
```

3

```
tccagggcta caggccacct gtggggacaa cacggacagt gggatctgcc tgcaggagcc 1200
cggcttacac tccagcatgg ggcccgcctg gaagcagcag cttggatata cccatcagga 1260
ccaggatgac agtgacgtta acctagtcca gaactctcca gggcagccta agtacacaca 1320
ggatgcatct gccttgggcc atgtctgtct cctagaacct aaagcccctg aggagaaaga 1380
ccaagtcatg gtgacattcc agggctacca gaaacagacc agatggaagg cagaggcagc 1440
aggcccagca gaactgcttgg acgaagagat tcccttgaca gatgcctttg atcctgaact 1500
tggggtacac ctgcaggatg atttggcttg gcctccacca gctctggccg caggttattt 1560
gaaacaggag tctcaaggga tggcttctgc tccaccaggg acaccaagta gacagtggaa 1620
tcaactgacc gaagagtggt cactcctggg tgtggttagc tgtgaagatc taagcataga 1680
aagttggagg ttcgcccata aacttgaccc tctggactgt ggggcagccc ctggtggcct 1740
cctggatagc cttggctcta acctggtcac cctgccgttg atctccagcc tgcaggtaga 1800
agaatgacag cggctaagag ttatttgtat tccagccatg cctgctcccc tccctgtacc 1860
tgggaggctc aggagtcaaa gaaatatgtg ggtccttttc tgcagaccta ctgtgaccag 1920
ctagccaggc tccacggggc aaggaaaggc catcttgata cacgagtgtc aggtacatga 1980
gaggttgtgg ctagtctgct gagtgagggt ctgtagatac cagcagagct gagcaggatt 2040
gacagagacc tcctcatgcc tcaggctgg ctcctacact ggaaggacct gtgtttgggt 2100
gtaacctcag ggctttctgg atgtggtaag actgtaggtc tgaagtcagc tgagcctgga 2160
tgtctgcgga ggtgttggag tggctagcct gctacaggat aaagggaagg ctcaagagat 2220
agaagggcag agcatgagcc aggtttaatt ttgtcctgta gagatggtcc ccagccagga 2280
tgggttactt gtgggctggga gatcttgggg tatacaccac cctgaatgat cagccagtca 2340
attcagagct gtgtggcaaa agggactgag acccagaatt tctgttcctc ttgtgaggtg 2400
tctctgctac ccatctgcag acagacatct tcatcttttt actatggctg tgtcccctga 2460
attaccagca gtggccaagc cattactccc tgctgctcac tgttgtgacg tcagaccaga 2520
ccagacgctg tctgtctgtg ttagtacact accctttagg tggcctttgg gcttgagcac 2580
tggcccaggc ttaggactta tgtctgcttt tgctgctaat ctctaactgc agacccagag 2640
aacagggtgc tgggctgaca cctccgtgtt cagctgtgtg acctccgacc agcagcttcc 2700
tcagggact aaaataatga ctaggtcatt cagaagtccc tcatgctgaa tgttaaccaa 2760
ggtgcccctg gggtgatagt ttaggtcctg caacctctgg gttggaagga agtggactac 2820
ggaagccatc tgtcccctg gggagcttcc acctcatgcc agtgtttcag agatcttgtg 2880
ggagcctagg gccttgtgcc aagggagctg ctagtccctg gggtctaggg ctggtccctg 2940
cctccctata ctgcgtttga gacctgtctt caaatggagg cagtttgcag ccctaagca 3000
aggatgctga gagaagcagc aaggctgctg atccctgagc ccagagtttc tctgaagctt 3060
tccaaataca gactgtgtga cggggtgagg ccagccatga actttggcat ctgccgaga 3120
aggtcatgac cctaatctgg tacgagagct ccttctggaa ctgggcaagc tctttgagac 3180
cccctggaa cctttattta tttatttgct cacttattta ttgaggaagc agcgtggcac 3240
aggcgcaagg ctctgggtct ctcaggaggt ctagatttgc ctgccctgtt tctagctgtg 3300
tgaccttggg caagtcacgt ttcctcgtgg agcctcagtt ttcctgtctg tatgcaaagc 3360
ttggaaattg aaatgtacct gacgtgctcc atccctagga gtgctgagtc ccactgagaa 3420
agcgggcaca gacgcctcaa atggaaccac aagtggtgtg tgttttcatc ctaataaaaa 3480
gtcaggtgtt ttgtgga 3497
```

<210> 3
<211> 867
<212> DNA
<213> Homo sapiens

<220>
<223> human B7-1 (CD80)

<400> 3
```
atgggccaca cacggaggca gggaacatca ccatccaagt gtccatacct caatttcttt 60
cagctcttgg tgctggctgg tctttctcac ttctgttcag gtgttatcca cgtgaccaag 120
gaagtgaaag aagtggcaac gctgtcctgt ggtcacaatg tttctgttga agagctggca 180
caaactcgca tctactggca aaaggagaag aaaatggtgc tgactatgat gtctgggga 240
atgaatatat ggcccgagta caagaaccgg accatctttg atatcactaa taacctctcc 300
attgtgatcc tggctctgcg cccatctgac gagggcacat acgagtgtgt tgttctgaag 360
tatgaaaaag acgctttcaa gcgggaacac ctggctgaag tgacgttatc agtcaaagct 420
gacttcccta cacctagtat atctgacttt gaaatcaa cttctaatat tagaaggata 480
atttgctcaa cctctggagg ttttccagag cctcacctct cctggttgga aaatgggaa 540
gaattaaatg ccatcaacac aacagttcc caagatcctg aaactgagct ctatgctgtt 600
agcagcaaac tggattcaa tatgacaacc aaccacagct tcatgtgtct catcaagtat 660
```

4

```
ggacatttaa gagtgaatca gaccttcaac tggaatacaa ccaagcaaga gcattttcct 720
gataacctgc tcccatcctg ggccattacc ttaatctcag taaatggaat ttttgtgata 780
tgctgcctga cctactgctt tgccccaaga tgcagagaga gaaggaggaa tgagagattg 840
agaagggaaa gtgtacgccc tgtataa                                      867
```

<210> 4
<211> 867
<212> DNA
<213> Macaca mulatta

<220>
<223> rhesus monkey B7-1 (CD80)

```
<400> 4
atgggccaca cacggaggca ggaaatatca ccatccaagt gtccatacct caagttcttt 60
cagctcttgg tgctggcttg tcttttctcat ttctgttcag gtgttatcca cgtgaccaag 120
gaagtgaaag aagtggcaac gctgtcctgt ggtcacaatg tttctgttga agagctggca 180
caaactcgca tctactggca aaaggagaag aaaatggtgc tgactatgat gtctgggdac 240
atgaatatat ggcccgagta caagaaccgg accatctttg atatcacaaa taacctctcc 300
attgtgattc tggctctgcg cccatctgac gagggcacat acgagtgtgt tgttctgaag 360
tatgaaaaag atgctttcaa gcgggaacac ctggctgaag tgatgttatc cgtcaaagct 420
gacttcccta cacctagtat aactgactct gaaattccac cttctaacat tagaaggata 480
atttgctcaa actctggagg tttttccagag cctcacctct cctggttgga aaatggagaa 540
gaattaaatg ccatcagcac aacagtttcc caagatcctg aaactgagct ctatactgtt 600
agcagcaaac tggatttcaa tatgacaacc aatcacagtt tcatgtgtct catcaagtat 660
ggacatttaa gagtgaatca gaccttcaac tggaacacac ccaagcaaga gcattttcct 720
gataacctgc tcccatcctg ggccattatc ctaatctcag taaatggaat ttttgtgata 780
tgctgcctga cctactgttt tgccccaagg tgcagagaga gaagaaggaa tgagacattg 840
agaagggaaa gtgtacgccc tgtatga                                      867
```

<210> 5
<211> 900
<212> DNA
<213> Rabbit (genus and species unknown)

<220>
<223> rabbit B7-1 (CD80)

```
<400> 5
atgggccaca cgctgaggcc gggaactcca ctgcccaggt gtctacacct caagctctgc 60
ctgctcttgg cgctggcggg tctccacttc tcttcaggta tcagccaggt caccaagtcg 120
gtgaaagaaa tggcagcact gtcctgtgat tacaacattt ctatcgatga actggcgaga 180
atgcgcatat actggcagaa ggaccaacag atggtgctga gcatcatctc tgggcaagtg 240
gaagtgtggc ctgagtacaa gaaccgcacc ttccccgaca tcattaacaa cctctccctt 300
atgatcctgg cactcgcgcct gtcggacaag ggcacctaca cctgcgtggt tcagaagaat 360
gagaacgggt cttcagacg ggagcacctg acctccgtga cactgtccat cagagctgac 420
ttccctgtcc ctagcataac tgacattgga catcccgacc ctaatgtgaa aaggataaga 480
tgctccgcct ctggaggttt tccagagcct cgcctcgcct ggatggaaga tggagaagaa 540
ctaaacgccg tcaacacgac ggttgaccag gatttggaca cggagctcta cagcgtcagc 600
agtgaactgg atttcaatgt gacaaataac cacagcatcg tgtgtctcat caaatacggg 660
gagctgtcgg tgtcacagat cttcccttgg agcaaaccca agcaggagcc tccattgat 720
cagcttccat tctgggtcat tatcccagta agtggtgctt tggtgctcac tgcggtagtt 780
ctctactgcc tggcctgcag acatgttgcg aggtggaaaa gaacaagaag gaatgaagag 840
acagtgggaa ctgaaaggct gtccctatc tacttaggct ctgcgcaatc ctcgggctga 900
```

<210> 6
<211> 102
<212> PRT
<213> Artificial Sequence

5

```
<220>
<223> Description of Artificial Sequence:truncated
      hepatitis B surface antigen (HBsAg) (PreS2 plus S
      regions)

<400> 6
Met Gln Trp Asn Ser Thr Thr Phe His Gln Thr Leu Gln Asp Pro Arg
 1               5                  10                  15

Val Arg Gly Leu Tyr Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val
            20              25                  30

Asn Pro Val Leu Thr Thr Ala Ser Pro Leu Ser Ser Ile Phe Ser Arg
        35                  40                  45

Ile Gly Asp Pro Ala Leu Asn Met Glu Asn Ile Thr Ser Gly Phe Leu
    50                  55                  60

Gly Pro Leu Leu Val Leu Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile
65                  70                  75                  80

Leu Thr Ile Pro Gln Ser Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe
                85                  90                  95

Leu Gly Gly Thr Thr Val
            100
```